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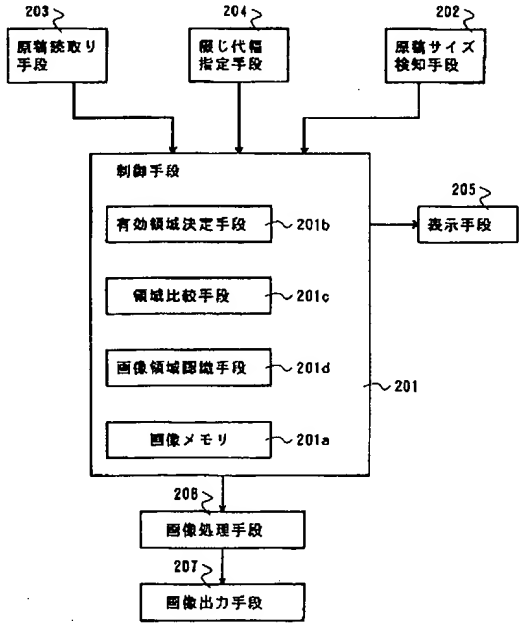
(54)【発明の名称】　画像形成装置

(57)【要約】
【目的】　所定サイズの原稿を予め決められたサイズの記録紙に２分割して記録する際において，画像欠落を排除した良好な画像を得る。
【構成】　綴じ代幅を指定する綴じ代幅指定手段２０４と，原稿サイズに基づき，読み取った画像を記録紙２枚に２分割する際，該２分割した各画像領域と，綴じ代幅指定手段２０４によって指定された綴じ代幅および予め設定されている余白部分とを除いた有効領域とを比較する領域比較手段２０１ｃと，該領域比較手段２０１ｃにより画像領域が有効領域に対して大きいとき，有効領域に合わせて画像を縮小し，画像領域が有効領域に対して小さいとき，そのままの大きさで画像処理を実行する画像処理手段２０６とを具備する。



JP-A No. 7-66968

[Title of the Invention]

IMAGE FORMING APPARATUS

[Abstract]

[Object]

When a draft having a predetermined size is recorded in two sheets of recording paper having a predetermined size while the draft is divided into two, a good image with no lack is obtained.

[Configuration]

The image forming apparatus includes binding margin width specifying means 204, region comparison means 201c, and image processing means 206. The binding margin width specifying means 204 specifies a binding margin width. When the read image is divided into the two sheets of recording paper based on the draft size, the region comparison means 201c compares each of the two divided image regions and an effective region except for the binding margin width specified by the binding margin width specifying means 204 and a predetermined margin portion. The image processing means 206 reduces the image according to the effective region when the region comparison means 201c determines that the image region is larger than the effective region, and the image processing means 206 performs image processing

at the same magnification when the region comparison means 201c determines that the image region is smaller than the effective region.

[What is Claimed is]

1. An image forming apparatus having draft reading means for reading a draft image, image data storage means in which image data read by the draft reading means is stored, and draft size detection means for detecting a draft size, the image forming apparatus comprising:

binding margin width specifying means for specifying a binding margin width;

region comparison means for comparing each of the two divided image regions and an effective region except for the binding margin width specified by the binding margin width specifying means and a predetermined margin portion, when the read image is divided into two sheets of recording paper based on the draft size; and

image processing means for reducing the image according to the effective region when the region comparison means determines that the image region is larger than the effective region, the image processing means performing image processing at the same magnification when the region comparison means determines that the image region is smaller than the effective region.

2. An image forming apparatus according to claim 1, wherein an A size sheet of paper is used as the recording paper.

3. An image forming apparatus according to claim 1, wherein the image processing means performs the reduction only in a direction in which the image region extends off the effective region.

[Detailed Description of the Invention]

[0001]

[Industrial Field of Application]

The present invention relates to an image forming apparatus such as a copying machine, a laser printer, and a facsimile machine, more particularly to the image forming apparatus which performs image processing so that an image region is contained in an effective region except for a binding margin width and a margin portion when a draft is divided into two to form an image in recording paper having a predetermined size.

[0002]

[Prior Art]

At first, the background art will be described. In an office environment, there are many documents having different sizes, and the documents are bound in files or books and stored on a desk or in a

cabinet. Generally, documents of A-sized paper such as A4 and A3 sizes are mainly used in private companies. On the other hand, in public offices, documents of B-sized paper are mainly used because of a law or a ministry ordinance. Thus, conventionally the A-sized documents and the B-sized documents are mixed in the office, storage and management working of the documents becomes troublesome.

[0003]

Due to the above circumstances, recently a government intends to integrate the document size, the newly produced documents are based on an integrated size (A size) from now. However, since the documents already produced are stored in the form of the B5 size original, generally the B5 size draft is copied in the B5 size recording paper when the copying machine is used in order to perform the process of copying the draft. Recent copying machines have a function of detecting a draft size and automatically selecting the recording paper corresponding to the draft size to form the image in the fed recording paper. In the copying machine having the above function, when the image is formed in the recording paper having the size different from the draft size, the operation becomes complicated. In the copying machine which does not have the above function, an operator often selects the recording

paper having the same size as the draft size in the case where plural sizes of recording paper are prepared in the copying machine. Therefore, the copying machine in which only the recording paper having the predetermined size can be prepared is required in order to integrate the document sizes in the office.

[0004]

A process of dividing the large draft into two to make a copy is known as one of means for eliminating the problem. For example, Japanese Patent Laid-Open Publication No. S60-146255 discloses "a copying method." This copying method is a page continuous recording method in which the large size draft is recorded in two sheets of small size recording paper. When a book is opened in a double-page spread to record each page in the individual sheet of recording paper, the image is contained in each page, the copying method disclosed in Japanese Patent Laid-Open Publication No. S60-146255 becomes effective means in the case where the image does not exist in a central portion. Fig. 6 shows an example of a copying process performed by the above copying method. Fig. 6A shows the A3 size draft 102 to be copied, and Fig. 6B shows an example in which the A3 size draft is copied in two sheets of A4 size recording paper while the A3 size draft is divided

into two at a portion shown by an alternate long and short dashed line.

[0005]

[Problems that the Invention is to Solve]

However, in the above conventional copying method, when the A3 size draft shown in Fig. 6A is simply divided into two at a center portion to shift an image position by adjusting the binding margin, because the image extend off the A4 size recording paper as shown in Fig. 6B, there is a problem that a lack of the image is generated.

[0006]

In view of the foregoing, an object of the invention is to securely eliminate the lack of the image to obtain the good image independently of the binding margin width, even if the binding margin is adjusted, when the draft having the predetermined size is recorded in the two sheets of recording paper having the predetermined size while the draft is divided into two.

[0007]

[Means for Solving the Problems]

The invention provides an image forming apparatus having draft reading means for reading a draft image, image data storage means in which image data read by the draft reading means is stored, and draft size detection means for detecting a draft size,

the image forming apparatus including binding margin width specifying means for specifying a binding margin width; region comparison means for comparing each of two divided image regions and an effective region except for the binding margin width specified by the binding margin width specifying means and a predetermined margin portion, when the read image is divided into the two sheets of recording paper based on the draft size; and image processing means for reducing the image according to the effective region when the region comparison means determines that the image region is larger than the effective region, the image processing means performing image processing at the same magnification when the region comparison means determines that the image region is smaller than the effective region.

[0008]

Further, an A size sheet of paper is used as the recording paper.

[0009]

Further, the image processing means performs the reduction only in a direction in which the image region extends off the effective region.

[0010]

[Effect of the Invention]

In the image forming apparatus according to the invention, the binding margin width specifying means

specifies a binding margin width. When the read image is divided into the two sheets of recording paper based on the draft size, the region comparison means compares each of the two divided image regions and the effective region except for the binding margin width specified by the binding margin width specifying means and a predetermined margin portion. As a result, the image processing means reduces the image according to the effective region when the image region is larger than the effective region, and the image processing means performs image processing at the same magnification when the image region is smaller than the effective region.

[0011]

[Embodiment]

Referring now to the drawings, an embodiment of an image forming apparatus according to the invention will be described below. Fig. 1 is an explanatory view showing a schematic configuration of the image forming apparatus to which the invention is applied. The apparatus integrally includes an image producing system 110 to which a general laser writing means is applied and an image reading apparatus 100 (hereinafter referred to as an image scanner). The apparatus has a combined structure in which the image scanner 100 is placed on the image producing system 110.

[0012]

In Fig. 1, the image scanner 100 is configured as follows: The reference numeral 101 denotes a contact glass on which a draft 102 is loaded. The reference numeral 103 denotes an exposure lighting unit which includes an exposure lamp, a mirror, and a lens. The exposure lighting unit 103 irradiates the draft 102 placed on the contact glass 101 with light to obtain reflected light according to the image of the draft 102, and the exposure lighting unit 103 guides and focuses the reflected light onto a reading sensor 104. The reference numeral 104 denotes the reading sensor which uses a CCD image sensor.

[0013]

The image producing system 110 is configured as follows: That is, the image producing system 110 mainly includes a laser writing system, an image producing system, and a paper-feed and conveying system. In the image forming apparatus, the laser writing system is accommodated in a laser writing unit denoted by the reference numeral 120. The laser writing unit 120 includes a laser output unit (not shown). The laser output unit includes a laser diode which is of a laser light source and a polygon mirror which is rotated at high and constant speed by a motor. A photoconductor drum 130 included in an image forming system is irradiated with a laser beam

which is output from the laser writing unit 120 through the polygon mirror and the mirror.

[0014]

The image forming system is configured as follows: That is, a charging roller 131, a development unit 132, a transfer roller 133, and a cleaning unit 134 are installed around the photoconductor drum 130. The charging roller 131 evenly charges a surface of the photoconductor drum 130 to the fed recording paper. The development unit 132 visualizes a formed electrostatic latent image. The transfer roller 133 transfers a toner image formed on the surface of the photoconductor drum 130. The cleaning unit 134 cleans the surface of the photoconductor drum 130 after the transfer process. A beam sensor (not shown) is arranged at a position, which is irradiated with the laser beam, in the vicinity of one end of the photoconductor drum 130. The beam sensor generates a main-scanning synchronizing signal.

[0015]

The paper-feed and conveying system is configured as follows: That is, the reference numerals 135 and 136 denote a paper-feed cassette respectively. Sheets of recording paper whose sizes are different from each other are loaded on the paper-feed cassettes 135 and 136 (for example, A4

size sheets are loaded on the cassette 135 and another size sheets are loaded on the cassette 136). The reference numerals 137 and 138 denote a paper-feed roller which feeds the recording paper from the paper-feed cassettes 135 and 136. The reference numerals 139 and 140 denote a recording-paper size detection sensor which detects the size of the recording paper. The reference numeral 141 denotes a registration roller which conveys the recording paper to a transfer portion at predetermined timing. The reference numeral 142 denotes a fixing unit which fixes the image on the recording paper conveyed through the transfer process. The reference numeral 143 denotes a paper-discharge roller, and the reference numeral 144 denotes a paper-discharge tray which receives the discharged recording paper.

[0016]

The basic operation of the image scanner 100 will be described below. The draft 102 loaded at a predetermined position of the contact glass 101 is irradiated with the light of the exposure lighting unit 103 and guided to the reading sensor 104 as the reflected light according to the image. Then, the reading sensor 104 reads the draft image in each line.

[0017]

The basic operation of the image producing system 110 will be described. The charging roller

131 evenly charges the surface of the photoconductor drum 130 at high voltage. When the surface of the photoconductor drum 130 is irradiated with the laser beam, a potential is decreased in the irradiated portion. Because the laser beam is on-and-off-controlled according to black and white of a recording pixel, a potential distribution corresponding to the recording image, i.e. the electrostatic latent image is formed on the surface of the photoconductor drum 130 by the irradiation of the laser beam.

[0018]

When a portion in which the electrostatic latent image is formed passes through the development unit 132, toner adheres according to a potential level to form the toner image in which the electrostatic latent image is visualized. On the other hand, the recording paper is conveyed to the portion in which the toner image is formed at predetermined timing by the registration roller 141, and the toner image is superposed on the recording paper. After the transfer roller 133 transfers the toner image to the recording paper, the recording paper is separated from the photoconductor drum 130. The separated recording paper is conveyed through a conveying path, the recording paper is thermally fixed by the fixing unit 142 including a thermal

roller into which a heater is incorporated and a pressure roller, and then the paper-discharge roller 143 discharges the recording paper onto the paper-discharge tray 144. After the transfer process is performed, the cleaning unit 134 cleans the surface of the photoconductor drum 130 to cause the photoconductor drum 130 to be ready for the next copying process.

[0019]

On the other hand, the recording paper in the paper-feed cassette 135 (136) is fed in a predetermined direction by the paper-feed roller 137 (138). The fed recording paper is temporarily stopped while engaging against the registration roller 141, skew (obliquely conveying) correction is performed to the recording paper, and the recording paper is conveyed to the transfer portion of the photoconductor drum 130 at the timing synchronized with the progress of the recording process.

[0020]

Fig. 2 is a block diagram showing the schematic configuration of a control system of the image forming apparatus according to the invention. In Fig. 2, the reference numeral 201 denotes control means for performing the control of the whole of the image forming apparatus on the basis of a control program. Particularly the control means 201 is formed by a

microcomputer which includes an image memory 201a, effective region determining means 201b, region comparison means 201c, and image region recognizing means 201d. The read image data is temporarily stored in the image memory 201a. The effective region determining means 201b determines an effective region except for a binding margin width and a predetermined margin portion. The region comparison means 201c compares the image region and the effective region. The image region recognizing means 201d recognizes the image region.

[0021]

The reference numeral 202 denotes draft size detection means (recording-paper size detection sensors 139 and 140 in Fig. 1) which detects the size of the draft 102 placed on the contact glass 101. The reference numeral 203 denotes draft reading means (image scanner 100 in Fig. 1) which optically reads the draft. The reference numeral 204 denotes binding margin width specifying means for specifying the binding margin width. The reference numeral 205 denotes display means for displaying a status of the apparatus, operation guidance, and the like. The reference numeral 206 denotes image processing means for performing a predetermined process to the read image data. The reference numeral 207 denotes image output means for outputting an image signal according

to the image data after the image processing to the laser writing unit 120 (see Fig. 1).

[0022]

Then, the operation will be described. For example, in the case where the copying process is performed to the A3 size draft 102, the draft 102 placed on the contact glass 101 is irradiated by the exposure lighting unit 103. At this point, the draft size detection means 202 detects that the size of the draft is A3. The control means 201 inputs information that the draft 102 has the A3 size and selects the paper-feed cassette 135 in which the A4 size sheets of recording paper are loaded. Therefore, the image is formed through the series of the processes on to the recording paper corresponding to a half size of the draft 102.

[0023]

Further, the operation of the invention will be described referring to Fig. 3. Fig. 3 is an explanatory view showing an example of the image processing according to the invention. Fig. 3A shows an example of the draft to which the copying process is performed. In this case, the draft 102 has the A3 size, and the draft 102 is formed by a left half page 102a and a right half page 102b while divided into two at the substantial center of the draft 102. The reference numerals 301 and 302 denote a maximum width

of the image to be printed in the left half page 102a and the right half page 102b. Fig. 3B shows a configuration of the effective region of the image, the margin portion, and the binding margin in the left half page 102a and the right half page 102b. The reference numerals 303 and 304 denote the effective region, the reference numeral 305 denotes the binding margin, and the reference numeral 306 denotes the margin portion. Fig. 3C shows a finally output image status of the recording paper.

[0024]

In Fig. 3, when the A3 size draft 102 is placed on the contact glass 101, the exposure lighting unit 103 irradiates the draft 102. At this point, the draft size detection means 202 detects that the draft 102 has the A3 size, and the control means 201 recognizes that the draft has the A3 size. The control means 201 automatically recognizes that the draft 102 is orientated in a longitudinal direction, because the whole area of the draft 102 having the A3 size cannot be place in a crosswise direction in the contact glass 101 of the embodiment. The same holds true for a B4 size draft.

[0025]

As shown in Fig. 3A, in the embodiment, the draft 102 is formed by the left half page 102a and the right half page 102b, and the whole image is read

through one scan of the exposure lighting unit 103. In the case where the draft 102 is larger than the A4 size, the following image processing is performed by the control means 201 and the image processing means 206.

[0026]

That is, as shown in Fig. 3A, the draft 102 is divided into the left half page 102a and the right half page 102b at the center of the draft 102, and the maximum widths 301 and 302 of the image to be printed are read respectively. Then, the region comparison means 201c compares the maximum width 301 of the image in the left half page 102a and the printing effective region 303 of the recording paper determined by the effective region determining means 201b, i.e. the region where the binding margin 305 and the margin portion 306 are excluded.

[0027]

The image processing means 206 receives the result performed by the region comparison means 201c. When the maximum width 301 is smaller than the effective region 303, the image processing means 206 performs the image processing to the image at the same magnification. On the contrary, when the maximum width 301 is larger than the effective region 303, the image processing means 206 performs a variable power process to the image so that the

maximum width 301 becomes less than the effective region 303. The image output means 207 outputs the image signal to the laser writing unit 120 based on the image processing, and the image is formed on the photoconductor drum 130 through the series of image forming processes. The same process is performed to the right half page 102b to output the image. As a result, the image shown in Fig. 3C can be obtained.

[0028]

The region comparison means 201b performs the comparison process only to the image regions in the crosswise direction. However, it is also possible that the region comparison means 201b performs the comparison process to the image regions both in the longitudinal direction and in the crosswise direction. As a result, the image can be more securely contained in the predetermined region of the recording paper. In the case of a reduction scale, it is possible that the longitudinal direction and the crosswise direction are independently varied.

[0029]

Fig. 4 is an explanatory view showing another example of the image forming apparatus to which the invention is applied. In the configuration shown in Fig. 4, an automatic draft conveying device 401 and a both-sides paper-feed device 410 are added to the image forming apparatus shown in Fig. 1. Therefore,

the constituents except for the automatic draft conveying device 401 and the both-sides paper-feed device 410 are indicated by the same reference numerals as Fig. 1, and the descriptions are neglected.

[0030]

The automatic draft conveying device 401 is attached to the top portion of the contact glass 101. The automatic draft conveying device 401 has the following configuration. That is, in Fig. 4, the reference numeral 402 denotes a draft table on which the plural sheets of draft 102 can be placed. The reference numeral 403 denotes a draft feed roller which feeds and conveys the draft 102 one by one. The reference numeral 404 denotes an edgeless conveying belt which conveys the draft. The conveying belt 404 is in close contact with and opposed to the surface of the contact glass 101. The reference numerals 405 and 406 denote a rotating belt drive roller which strains the conveying belt 404 from the inside of the conveying belt. The reference numeral 407 denotes a draft discharge table on which the draft 102 is discharged after the reading process.

[0031]

The both-sides paper-feed device 410 is provided between the image forming system and the paper-feed cassette 136. The both-sides paper-feed

device 410 is configured as follows: That is, in Fig. 4, the reference numeral 411 denotes a conveying path switching pawl which is provided immediately after the fixing unit 142. The conveying path switching pawl 411 switches between a paper-discharge path and a both-sides conveying path of the recording paper based on a switch signal from the control means 201. For example, the conveying path switching pawl 411 is operated based on the switch signal of the control unit 201 by a usually used switching mechanism (not shown) in which a solenoid is adopted. The reference numeral 412 denotes the both-sides conveying path in which the recording paper is reversed. The both-sides conveying path 412 is configured so that the recording paper is turned to guide the recording paper to the both-sides paper-feed device 410. That is, the conveying path from the conveying path switching pawl 411 to the both-sides paper-feed device 410 is formed in an S-shape. The reference numeral 413 denotes a both-sides paper-feed roller.

[0032]

Then, the operation will be described. When a copying start direction is given, the draft feed roller 403 is rotated to feed the draft 102 placed on the draft table 402 one by one. Then, the draft 102 is conveyed to the predetermined position on the contact glass 101 by the conveying belt 404, and the

draft 102 is stopped. In the state of things, the draft 102 is discharged to the draft discharge table 407 by rotating the conveying belt 404 by 180° after the exposure lighting unit 103 reads the image from the draft 102. As with the image forming process described in Fig. 1, the image read by the exposure lighting unit is formed on the recording paper and the fixing process is performed to the image on the recording process.

[0033]

Then, because the conveying path is switched to the side of the both-sides conveying path 412 (position shown by broken lines) by the conveying path switching pawl 411, the recording paper is guided to the both-sides paper-feed device 410 through the both-sides conveying path 412 while the recording paper is reversed, and the recording paper is immediately fed again to pass through the transfer portion without forming the image. At this point, because the conveying path switching pawl 411 is located at the position shown by the solid lines, the recording paper is discharged to the paper-discharge tray 144 while the image surface is faced downward. That is, facedown paper discharge is performed by using the both-sides paper-feed device 410.

[0034]

The above operation will be described in

further detail. For example, when one A3 size draft shown in Fig. 3A is placed on the automatic draft conveying device 401, the draft 102 is read through the above series of operations, and the image is temporarily stored in the image memory 201a in the control means 201. Then, the image of the left half page 102a in the image read from the draft is output by the image output means 207 and written in the surface of the photoconductor drum 130 through the laser writing unit 120. Then, as shown on the left side in Fig. 3C, the image is formed through the above copying process. Therefore, the image based on the side of the rear end in the conveying direction is formed onto the A4 size recording paper whose longitudinal direction is parallel to the conveying direction. The recording paper is discharged on the paper-discharge tray 144 while the image surface is faced upward (face-up).

[0035]

Then, the second copying process is performed. The image output means 207 writes the image of the right half page 102b on the surface of the photoconductor drum 130 through the laser writing unit 120. Then, as shown on the right side in Fig. 3C, the image is formed through the above copying process. At this point, for the image formed on the recording paper, the image based on the side of the

front end in the conveying direction is formed onto the A4 size recording paper whose longitudinal direction is parallel to the conveying direction as shown in Fig. 3C. Therefore, when the sheets of recording paper are bound to see the images in the left half page 102a and the right half page 102b in the double-page spread, the bound sheets can be realized by the face-down paper discharge in which the image surface of the right half page 102b is faced downward.

[0036]

That is, after the recording paper in which the image of the right half page 102b is formed is fixed, the conveying path switching pawl 411 is switched to the position shown by the broken lines, the recording paper is guided to the both-sides conveying path 412 to temporarily store the recording paper in the both-sides paper-feed device 410, and the recording paper is immediately fed again. At this point, the recording paper is caused to pass through the transfer portion without forming the image, and the recording paper is discharged on the paper-discharge tray 144 while the image surface is faced downward (the face-down paper-discharge). Therefore, the recording paper obtained by the first copying process and the recording paper obtained by the second copying process are discharged while the image

surfaces are opposed to each other. In the state of things, when the first recording paper and the second recording paper are bound, the images in the left half page 102a and the right half page 102b can be seen in the double-page spread.

[0037]

In the embodiment, the reverse paper-discharge of the recording paper, i.e. the facedown paper-discharge is performed with the both-sides paper-feed device 410. In addition, the process can be performed at higher speed with a reverse paper-discharge device (reverse stacker) usually used.

[0038]

In the above embodiment, the case in which one sheet of draft 102 is used is described. The case in which the plural sheets of draft 102 are placed on the draft table 402 will be described below. However, in this case, it is assumed that the image is recorded only in one side of each of the plural sheets of draft 102 or the image to be copied is located only in one side of each of the plural sheets of draft 102. The image (first image) of the left half page 102a of the first draft 102 is formed in the similar way described above. Then, the image (second image) of the right half page 102b is formed in the recording paper, and the recording paper in which the second image is formed is accommodated in

the both-sides paper-feed device 410 and becomes a standby state at this position. Then, the second draft 102 is fed at the same time when the first draft 102 is discharged.

[0039]

When the second draft 102 (second draft) is read, the second recording paper in the standby state is fed from the both-sides paper-feed device 410 again, the first image of the second draft is recorded in the backside of the second recording paper. In this case, the image formation is performed by the same way as the case of the first image of the first draft. The same process is repeatedly performed to the number of drafts 102. Therefore, while the sheets of recording paper discharged on the paper-discharge tray 144 can be taken out and bound as it is, book-shaped copy product can be obtained.

[0040]

Fig. 5 is a flowchart showing the operations of a binding margin setting process and an image size process in the image processing of the invention. In Fig. 5, the binding margin 305 is input by the binding margin width specifying means 204 (S501). Therefore, the effective region determining means 201b determines the effective regions 303 and 304 except for the margin portion 306 previously set to

the size of the recording paper. Then, the image information is read from the draft 102 (S502), and the region comparison means 201c determines whether the read images are located within the effective regions 303 and 304 respectively or not (S503). In Step S503, when the region comparison means 201c determines that the read images are located within the effective regions 303 and 304, the print process is performed in the image having the same magnification (S504).

[0041]

On the contrary, in Step S503, when the region comparison means 201c determines that the read images are not located within the effective regions 303 and 304, i.e. when the region comparison means 201c determines that the image is larger than the effective region 303 or 304, whether the image is reduced or not is further displayed in the display means 205 to cause an operator to make a judgment (S505). In Step S505, when the operator determines that the image is not reduced, the print process is performed in the image having the same magnification (S504). On the contrary, when the operator determines that the image is reduced, the image processing means 206 performs a reduction process at a reduction rate such that the images are contained within the effective regions 303 and 304 respectively

(S506), and the print process is performed through the image output means 207 while the image is reduced (S504).

[0042]

In the embodiment, the image forming apparatus is described as the copying machine. However, the invention is not limited to the copying machine, the same process as the embodiment can be performed in the image output of a laser printer or a facsimile machine. For example, when only the A4 size sheets of recording paper is accommodated in the apparatus, or when the recording paper having the size not larger than A4 cannot be used, in the case where the image data having the size not larger than A4 is input online or offline, as with the embodiment, it is possible that the image output is performed while the image data having the size not larger than A4 is divided into two pages.

[0043]

In a method of placing the draft in the copying machine, there are two methods, i.e. a guide center method and a guide corner method. In the guide center method, the draft 102 is divided at the center of the contact glass 101. The guide corner method is based on a front side of the contact glass 101. In the embodiment, the guide corner method is described as an example. However, the guide center method can

also be applied.

[0044]

In the embodiment, the whole image of the draft 102 is read at once, the read image data is stored in the image memory 201a of the control means 201, and the image processing is performed. However, in the case of Fig. 3A, it is also possible that the same process is performed by reading the image of the draft 102 in twice such that the left half page 102a is first read and then the right half page 102b is read.

[0045]

[Effect of the Invention]

As described above, in accordance with the image forming apparatus according to the invention, when the binding margin width is specified to divide the read image into the two sheets of recording paper based on the detected draft size, each of the divided image regions is compared to the effective region except for the specified binding margin width and the predetermined margin portion. As a result, the image is reduced according to the effective region when the image region is larger than the effective region, and the image processing is performed at the same magnification when the image region is smaller than the effective region. Therefore, when the draft having the predetermined size is recorded in the two

~~sheets of recording paper having the predetermined~~ size while the draft is divided into two, even if the binding margin is adjusted, the good image with no lack can be obtained independently of the binding margin width.

[Brief Description of the Drawings]

Fig. 1 is an explanatory view showing a schematic configuration of an image forming apparatus to which the invention is applied;

Fig. 2 is a block diagram showing the schematic configuration of a control system of the image forming apparatus according to the invention;

Fig. 3 is an explanatory view showing an example of image processing according to the invention;

Fig. 4 is an explanatory view showing another configuration of the image forming apparatus to which the invention is applied;

Fig. 5 is a flowchart showing operations of a binding margin setting process and an image size process in the image processing of the invention; and

Fig. 6 is an explanatory view showing an example of a copying process in the conventional art.

[Description of the Reference Numerals and Signs]

201 Control means

201a Image memory

201b Effective region determining means

201c Region comparison means

201d Image region recognizing means

202 Draft size detection means

203 Draft reading means

204 Binding margin width specifying means

206 Image processing means

301 and 302 Maximum width of image

303 and 304 Effective region

305 Binding margin

306 Margin portion

Fig. 2

203 Draft reading means

204 Binding margin width specifying means

202 Draft size detection means

201 Control means

201b Effective region determining means

201c Region comparison means

201d Image region recognizing means

201a Image memory

206 Image processing means

207 Image output means

Fig. 5

START

S501 Set binding margin width (set effective region)

S502 Read draft image

S503 (Region comparison) Image is located within region?

S504 Printing process

S505 (Display) Reduction is performed?

S506 Reduction process

END